



AUGUST 2014

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# SPACE LAUNCH SYSTEM HIGHLIGHTS

## NASA Completes Key Review of World's Most Powerful Rocket in Support of Journey to Mars

NASA officials announced Aug. 27 they have completed a rigorous review of the Space Launch System (SLS)—the heavy-lift, exploration class rocket under development to take humans beyond Earth orbit and to Mars—and approved the program's progression from formulation to development, something no other exploration class vehicle has achieved since the agency built the space shuttle. "We are on a journey of scientific and human exploration that leads to Mars," said NASA Administrator Charles Bolden. "And we're firmly committed to building the launch vehicle and other supporting systems that will take us on that journey." For the full story, click [here](#).  
(Artist Concept: NASA)



## NASA's Space Launch System Boosters Office Completes Critical Design Review



As progress continues on NASA's new rocket, the Space Launch System (SLS), the solid rocket boosters team successfully completed its critical design review Aug. 6. This is an important milestone for the program, as it verifies the boosters are ready to move forward with qualification testing. "We continue to make great progress as demonstrated by this successful review and are proceeding towards the qualification testing of the booster," said Todd May, manager of the SLS Program at NASA's Marshall Space Flight Center. "Our program continues to move forward because of the people that believe in and are working aggressively to build this rocket." For the full story, click [here](#). (Artist concept: NASA)

## Quiet, Please: NASA Engineers Wrapping Up Acoustic Testing for Space Launch System

Engineers at NASA's Marshall Space Flight Center are wrapping up acoustic testing on a 5-percent scale model of NASA's Space Launch System (SLS). The Aug. 28 test, the 34th in the series, will help NASA engineers understand how loud the SLS vehicle will be during liftoff. Data from the test series will be used to design the water sound suppression system that reduces liftoff vibrations on the vehicle. "We have almost completed testing to encompass all of the liftoff noise levels SLS could experience during launch," said Jeremy Kenny, SLS acoustics engineer at the Marshall Center. "The latest test will inform us of the liftoff noise levels as the vehicle is positioned approximately 150 feet above the deck that the model is positioned on." For the full story, click [here](#). (NASA/MSFC)





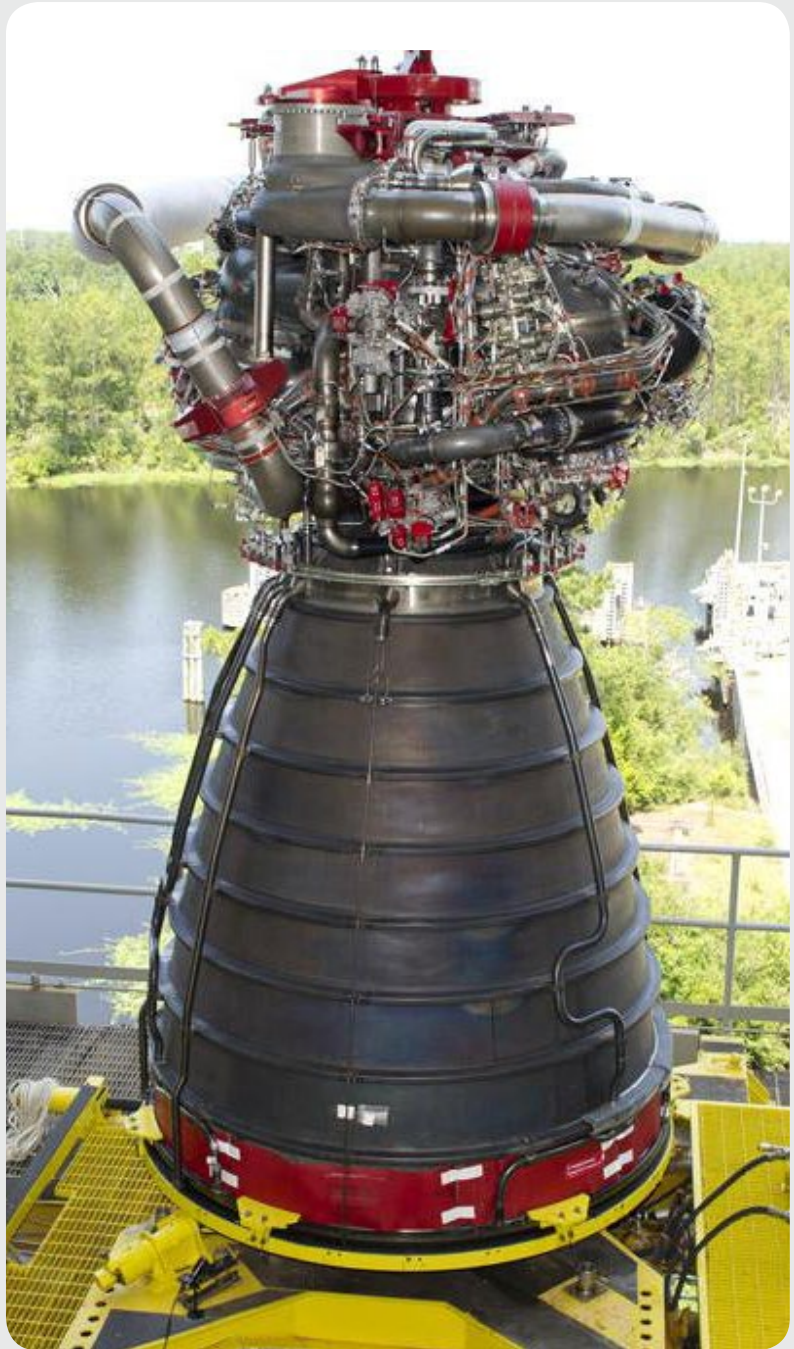
# Spaceflight Partners: ICO RALLY

*EDITOR'S NOTE: Every month, SLS Highlights turns the spotlight on one of the many industry partners helping to create the largest rocket ever built for human space exploration. In this issue, we profile ICO RALLY of Palo Alto, California.*

ICO RALLY was founded in 1950 with corporate headquarters located in Palo Alto, California. The company was originally modeled as a broad-breadth supplier of electrical and electronic materials and components, with many of its products manufactured to custom specifications.

In 2010, ICO RALLY began to investigate potential niche markets that were being underserved in the space, aerospace and defense sectors. What evolved out of these efforts was a category of products and services that was branded S3 referring to Specialty and Security Sensitive Products. Government agencies, specifically NASA, as well as prime contractors and subcontractors involved in programs requiring high-reliability products and support services were the focus of S3's strategic vision. ICO RALLY's S3 program provides Electrical, Electronic and Electromechanical (EEE) Parts management including testing, screening and additional qualifications that may be required. Counterfeit parts detection and avoidance is also a critical element of S3. Other capabilities include cable, harness and electro-mechanical assembly.

ICO RALLY has supported Aerojet Rocketdyne with supply chain management services for products associated with the J-2X engine development and most recently Aerojet Rocketdyne's SLS RS-25 core stage main engines. In addition to SLS initiatives, ICO RALLY supports Aerojet Rocketdyne with supply chain management services for products used in conjunction with new lithium ion battery technology to power solar arrays on the International Space Station.



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## No Geysers Allowed: NASA Engineers Begin Testing for SLS Liquid Oxygen Feed System

A full-scale replica of the SLS liquid oxygen tank feed system—which will be housed in the rocket’s core stage—is set up on one of Marshall’s test stands to show that proven procedures will keep the tank’s thousands of gallons of oxidizer from geysering. Oxidizer is a type of chemical that fuels require to burn. As propellant is poured into the system from the bottom, helium is injected into different points along two feed lines that deliver the propellant all the way up to the tank. “The helium really acts as a spoon—it induces circulation almost like stirring and keeps the propellant uniform and at the right temperature,” said Jacob Parton, anti-geyser test conductor. “This is the largest testing effort I’ve been a part of at Marshall. It took about 12 trailers carrying approximately 6,000 gallons of propellant each to fill the test article tank.” For the full story and video, click [here](#). (NASA/MSFC)

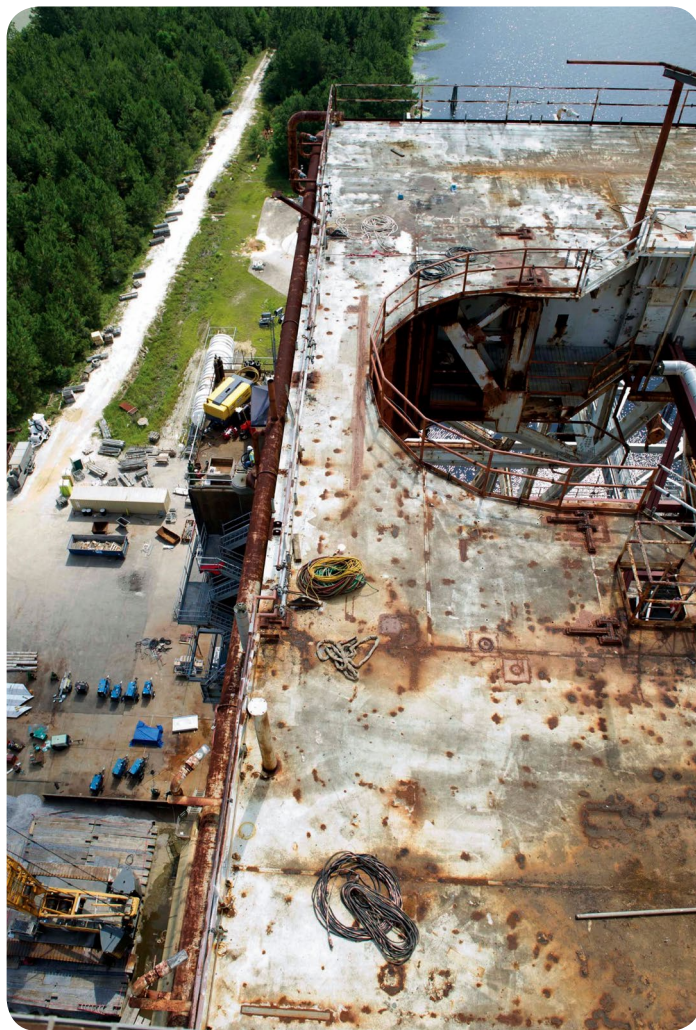
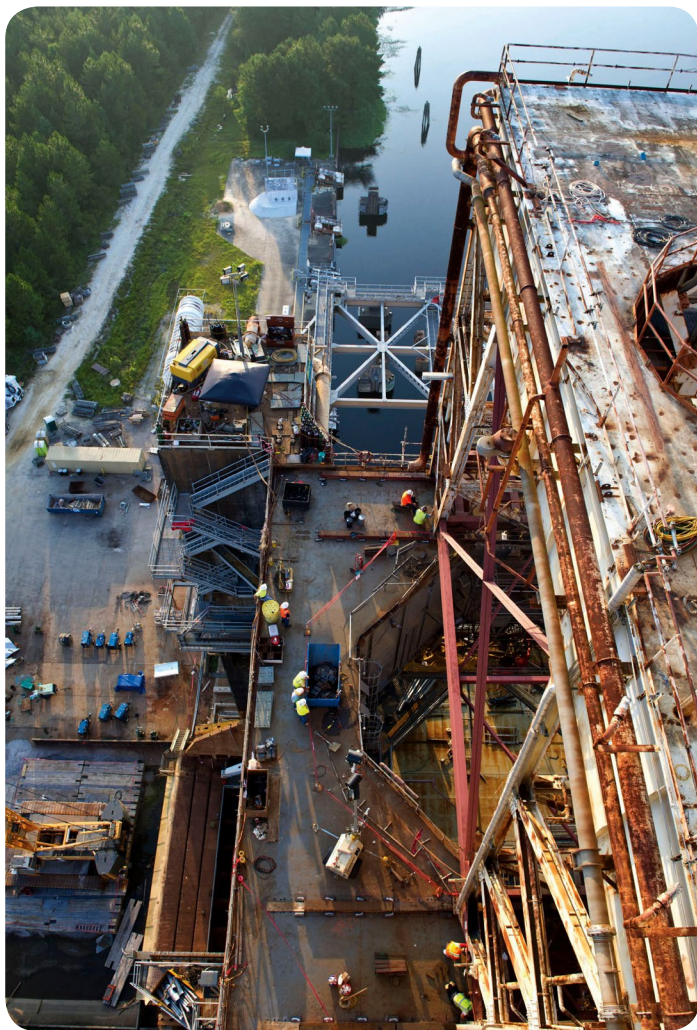
## SLS Booster Forward Skirt Tested to the Limits (Again)

The booster forward skirt provides the critical connection between NASA’s Space Launch System (SLS) core stage and its twin solid rocket boosters. The hardware proved it could withstand millions of pounds of launch load during a series of tests in May. To be sure to cover all possible scenarios, the structure was tested again in early August—increasing the liftoff and ascent conditions to more than a dozen scenarios, and ultimately to structural failure. Completion of this testing and some remaining analysis brings NASA closer to using this proven hardware on SLS. (ATK)





# A Million-Pound Move

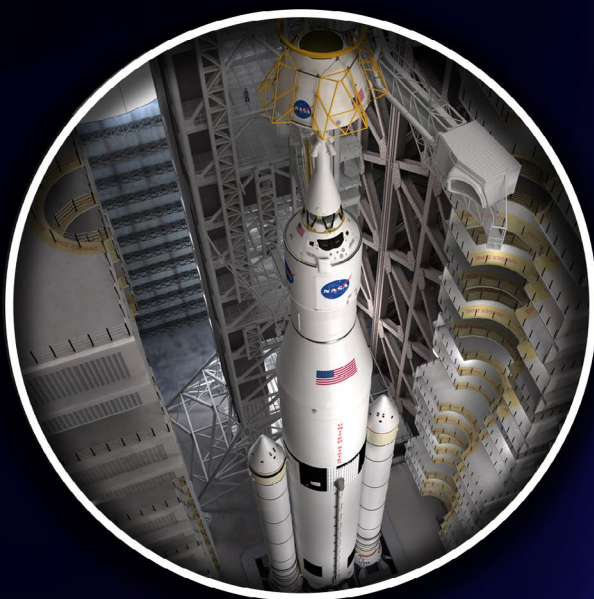


NASA took a big step forward in preparing to test its SLS core stage with a 20-foot repositioning of the Main Propulsion Test Article (MPTA) structure Aug. 7 on the B-2 test stand at NASA's Stennis Space Center. The existing framework structure, built in the late 1970s to support testing of the space shuttle MPTA, stands 61 feet high and contains about 1.2 million pounds of fabricated steel. It was shifted atop its test stand base platform—known as the “battleship”—to accommodate the SLS core stage, which is taller than the Apollo/Saturn first stage and the space shuttle MPTA. After the move, another 1 million pounds of steel will be added to extend the structure 100 feet higher, a task targeted for completion by year's end. “A lot of planning and preparation went into making this move happen,” said John Rector, SLS Stages Green Run test manager. “We have a great team across several NASA centers that is working hard to ensure the B-2 stand is ready for core stage testing in 2016.” For the full story and video, click [here](#). (NASA/Stennis)





# A B O L D E R M I S S I O N



## Space Launch System

Space Launch System, or SLS, begins a bolder mission for NASA and the world—a new era of exploration unlike anything we've done before. Able to carry more payload than the space shuttle and generate more thrust at launch than the Saturn V, SLS will send the Orion spacecraft farther into space than Apollo ever ventured...and that's just the first flight!

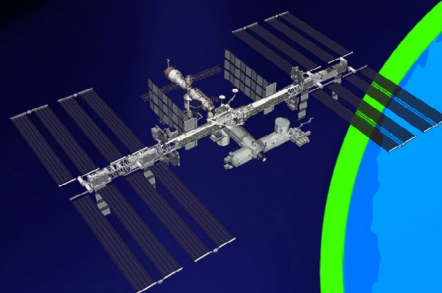
### Low-Earth Orbit:

Low-Earth orbit, or "LEO," is a term used to describe an orbit between 99 miles and 1,200 miles above the surface of the Earth. Relative to the size of the Earth, the green circle at right is approximately 250 miles thick and indicates the altitude at which the International Space Station currently orbits the Earth.

Apart from the lunar flights of the Apollo Program over 40 years ago, every human space flight in history has remained within the boundaries of LEO.

### Exploring New Destinations:

Space Launch System is a deep space vehicle capable of extending our reach into the solar system. With unrivaled lift and unprecedented cargo capacity, NASA will launch people and payloads even farther into space than previously possible.



Asteroids offer exciting new possibilities as potential destinations for future SLS missions.



# SLS On the Road...



SLS Program Manager Todd May speaks Aug. 8 at the International Mars Society Convention in League City, Texas. (NASA/MSFC)



SLS Program Deputy Manager Keith Hefner talks about SLS Aug. 27 at the Jackson Business Forum in Jackson, Mississippi. "Ultimately what we're doing here is—we're going to Mars," Hefner said. (NASA/MSFC)



Michelle Tillotson, standing at left, and Eric Gilligan, right, speak to a crowd Aug. 24 at the Lehigh Valley Airshow in Allentown, Pennsylvania. Tillotson and Gilligan, both engineers at NASA's Marshall Space Flight Center, gave several presentations and participated in a Tweet Chat about SLS during the three-day event. (NASA/MSFC)

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## SLS on Deck:

- Vertical Assembly Center ribbon cutting
- SLS base heating testing
- STEM Festival at Georgia Southern University